INTEGRATED SMART NUTRITIONAL ANTHROPOMETRIC SURVEY

FINAL REPORT

ABIEMNOM COUNTY

SOUTH SUDAN

Survey organized and implemented by:
Care International

With funding from UNICEF

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ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

SMART Nutrition Survey was undertaken in Abiemnom County from 5th to 15th May 2017 in which a total of 470 households were assessed. The survey was organized by CARE International in collaboration with County Health Department and with technical support from Nutrition Information Working Group (NIWG). This report provide the analysis of all nutrition anthropometric, mortality, infant and young child feeding, health, WASH, food security and livelihoods indicators assessed based on the survey objectives.

Methodology
An integrated cross-sectional nutrition survey which used two stage sampling was planned using the SMART Methodology for both the anthropometric and retrospective mortality surveys. First stage used ENA software to assign clusters while the last stage selected the primary sampling units (households). Anthropometric sample produced 444 households with 590 children of 6-59 months while mortality sample included 463 households and 3253 population to assess. Mortality household sample (463) was used during the implementation of the survey as it was little larger than anthropometric sample. Additional information was collected using IYCF, FSL and WASH questionnaires. Mortality, FSL and WASH questionnaires were administered in all selected households. Anthropometric questionnaire was administered in households with children of 6 to 59 months while IYCF questionnaire was applied in households with children 0-23 month old, pregnant and lactating mothers. Training of enumerators was done in 4 days and data collection for 6 days. All selected clusters were visited successfully.

Discussions
During data collection, 470 households from 34 clusters were visited for mortality, WASH and food security. A total of 689 children of 6 to 59 months were assessed for anthropometric survey. However, 676 children were subjected for analysis, the balance of 13 were excluded from the analysis by the SMART flag as they were out of range values. 316 children of 0-23 months together with 314 pregnant and lactating mothers were assessed for IYCF questionnaire.

Morbidity results have remained constantly high like seen in previous surveys done in the county. Conglomeration of high morbidity prevalence and hunger especially during the pre-harvest period might be responsible for high malnutrition rates. The GAM result for this survey is lower than May 2016 GAM, however, it remained above the emergency (15%) level set by WHO.

Mortality results for CDR and U5MR fall below the emergency levels. Vitamin A supplementation and immunization remained above 70%, however, deworming and mosquito net utilization recorded less than 50%, a situation seen in previous surveys.
IYCF results of ever breastfed, early initiation to breast feeding and continued breast feeding have shown continued improvement, however, exclusive breast feeding and complementary feeding results in this survey compared to previous surveys, have not improved.

Most households use water from borehole for drinking more than other sources. Latrine use together with soap use during hand washing have recorded some improvements.
Above 70% households reported to have cultivated last year, this might be reason why hunger is not prevalence compared to same time last year. Main source of food during 7 days prior to the survey for more than 50% households was own production as opposed to last season when it was purchases from the market. This is also supported by main sources of income generation such as salaried work and sale of crops. The results of FCS is at acceptable (>35) with population mean of 35.6 and household median value of 33.5. Table 1 one below show the results for this survey.

Table 1: Summary of key anthropometric and mortality results

INDEX		INDICATOR	RESULTS (95% C.I)
DEMOGRAPHIC DATA			
Total number of households assessed for nutrition and other indicators			**470**
Total number of children [6-59months] assessed for nutrition status			**689**
Total number of children [under 5] in households assessed for mortality			**811**
Total number of HHs with children under five			424
Average household size			7.7
Mid Interval Population Size			3627
Number of Clusters			34
Percentage of children under five			23.3
Birth Rate			1.44
In-migration Rate (Joined)			2.21
Out-migration Rate (Left)			5.88
ANTHROPOMETRIC RESULTS			
WHOS(2006) N=676	Z-scores	Global Acute Malnutrition W/H <-2 z and/or oedema	20.1% [17.2-23.4 95% CI]
		Severe Acute Malnutrition W/H < -3 z and/or oedema	5.2% [3.8- 7.0 95% CI]
MUAC N=689	Height ≥65cm	Global Acute Malnutrition [MUAC<125mm]	13.6 %[10.2 - 18.0 95% CI]
		Severe Acute Malnutrition [MUAC<115mm]	2.3 %[1.1 - 5.0 95% CI]
MORTALITY			
Crude retrospective mortality [last 3 months] /10,000/day			0.22(0.08-0.59) 95% CI]
Under five crude retrospective mortality /10,000/day			0.31(0.07-1.28) 95% CI)
Measles Immunization			
Measles immunization coverage [N=644 children ≥ 9months old]		By card [yes=545]	79.1%[75.8 ↔ 80.095% CI]
VITAMIN A SUPPLEMENTATION			
Vitamin A supplementation in the last 6 months [n=689]		Received [521]	75.6% [72.2 ↔ 78.7,95% CI
MORBIDITY		**Frequency**	**Percentage**
Prevalence of reported illness n=689		yes=355	51.5%[47.7↔55.3,95% CI]
(Proportion of children aged 6-59 months of age who had symptoms of illness 2 weeks prior to the survey reported) n=441		Diarrhoea[yes=139]	31.5%[27.3 ↔ 36.1,95% CI]
		Fever[yes=111]	25.2%[21.2 ↔ 29.5,95% CI]
		Cough [yes=110]	24.9%[21.0 ↔ 29.3 95% CI]
		Other [yes=81]	18.4%[14.9 ↔ 22.4,95% CI]
Households with Long Lasting Treated Net (n=689, yes=268)			38.9%[35.3 ↔ 42.7,95% CI]
Proportion of children who got deworming tablets (n=595, yes=245)			41.2%[37.2 ↔ 45.3,95% CI]
Food Security (N=470)			
Proportion of households who cultivated last season [yes=346]			73.6%[69.3↔77.5,95% CI]
Main sources of income in past 30 days		Sale of crops (yes=111)	23.6%[19.9↔27.8,95% CI]
		Salaried work (yes=154)	32.8%[28.6↔37.2,95% CI]
Main source of food in past 7 days (own production, yes=273)			58.1%[53.5↔62.6,95% CI]
Head of household		Male headed households (1=323)	68.7%[64.3↔72.9 95% CI]
		Female headed households (2=147)	31.3%[27.1↔35.7 95% CI]
Residence status		(Residents 1=447)	95.1%[92.6↔96.8 95% CI]

Households who own cattle (1=238)	50.6%[46.0↔55.2 95% CI]
Food Consumption Score [Acceptable (FCS >35)]	46.0%[41.4↔50.6 95% CI]
WASH (N=470)	
Household main source of drinking water (Borehole, yes=463)	98.5%[96.8 ↔ 99.3 95% CI]
Common human waste disposal area (latrine, yes=290)	61.7%[57.1↔ 66.195% CI]
Households that do not treat water (no=335)	71.3%[66.9↔75.395% CI]
Time when mothers wash hands (before cooking yes=295)	63.0%[58.5↔67.4 95% CI]
Use of soap during hand washing (yes=297)	63.2%[58.6↔67.5 95% CI]
IYCF Results	
Ever breast (yes=306) (0-23ms)	96.8%[94.1↔98.4,95% CI]
Early initiation of breast feeding within one hour (yes=272(0-23ms)	86.1%[81.8↔89.7 95% CI]
Children still breast feeding (yes=293 (0-23ms)	92.7%[89.1↔.95.2,95%CI]
Children breast fed exclusively (yes=33(0-5ms)	50.0%[37.4↔62.6 95% CI]
Complementary feeding (yes=15(6-8ms)	33.3%[20.0↔49.0 95% CI]
Continued breast feeding at 1 year (yes=47(12-15 ms)	94.0%[83.5↔98.7 95% CI]
Continued breast feeding at 2 years (yes=33(20-23 ms)	82.5%[67.2↔92.7 95% CI]

Recommendations

The following recommendations are based on the survey results, and are importance for Care South Sudan, as this survey was done to ascertain nutritional status of the children in Abiemnom County in addition to other underlying causes of malnutrition.

Immediate or Short-term

1. The GAM rate 20.1 % [17.2 - 23.4] found is lower compared to May 2016 survey, however, it is higher than the WHO emergency level (15%). This has come too early in the year and is an indication that malnutrition rates will increase in the coming hunger gap period. CARE to strengthening CMAM program including Mobile response to respond to the raising rates of malnutrition in the area. One possible preparation is to pre-position nutrition items and essential drugs to the area when the roads are still passable.

2. It was evidenced during data collection that many malnourished children were in the community, this call for improved active case finding in all Payams of the county to bring most of malnourished children to facilities for treatment, especially moderately malnourished.

3. Exclusive breast and complementary feeding have continue to be poorly observed by mothers/caregivers over the years, this need some serious and continued engagement with the community to find a solution.

4. Establish awareness campaigns and community education programmes on infant and young child feeding practices

5. Deworming is poor in the community as revealed by the survey results, CARE South

Sudan and partners should put in place a strong deworming program to reach all the children in the community.

6. Continue immunizations and vitamin A supplementation activities to reach the few children who have not yet receive the services in the community.

7. Aware the community on the importance of soap use during hand washing.

8. There is need to lobby and advocate among organizations involved in WASH to improve the latrine coverage and curtain the practice of using designated open areas for defecation.

Long-term

9. Apart from the program to aware the community about the importance of continued attendance at the nutrition centre, for long term improvement, tailored messages should be developed and use to aware mothers of the children visiting the nutrition centres. This can help them on child feeding using the little resources available at home. They can be able to diversify the diet of their children.
10. There is no food security and livelihood program established in the area, there is need to have it so that the population can be provided with seeds and good agricultural methods to help boost food production.

11. In order to enhance food security and there by improve food consumption at household level, there is a need for implementation of comprehensive food security and livelihoods programs. Promotion of small gardens for production of vegetables and fruits at household level could be considered to improve household food security and consumption of diversified foods.

1.0 INTRODUCTION

1.1 Background
Geographical description of the area
Abiemnom County is found in northern part of South Sudan. The county is made of seven Payams and mostly rural settlement. The SMART Survey was conducted during the dry season of the year and covered all the 7 Payams of the county. There are no well-built roads however, bush roads are the most commonly used during dry season. The roads connecting Abiemnom to Mayom County and Abyei Administration Area are passable throughout all seasons but with difficulty during wet season. Anet in Agok, is the main market where the population from Abiemnom access consumable goods.

Description of study population
Abiemnom County has an estimated population of **31,465,** of which **6608 (21%)** are children below the age of five years. The population is generally composed of Dink with few people of Nuer origin from neighbouring Mayom County. The population practice crop farming and animal production, as major livelihood activities. Target population are children under the age of five years, pregnant and lactating mothers. This assessment forms part of the surveys that are conducted yearly by CARE to monitor and evaluate changes in nutritional situation of the area.

1.2 Survey Objectives
The overall objective of the integrated SMART survey in Abiemnom County was to determine the levels of malnutrition among children aged 6-59 months and mortality among the wider population. In addition, the survey aimed to analyze the possible factors contributing to malnutrition including illnesses, as underlying diseases and food security.

Specific Survey Objectives

- To estimate prevalence of global and severe acute malnutrition and chronic malnutrition among children aged 6-59 months
- To estimate proxy prevalence of acute malnutrition in pregnant and lactating mothers
- To determine retrospective crude mortality rates (CMR) and under five mortality rates (U5MR)
- To estimate the occurrence of two-week retrospective in under five children
- To estimate the coverage of measles vaccination (9-59 months) and vitamin A supplementation status among children aged 6-59 months
- To determine infant and young child feeding practices
- To assess the current household food security situation of the county
- Establish the source of drinking water and water management at household level and presence and use of latrines.

2.0 SURVEY METHODOLOGY

An integrated cross-sectional nutrition survey was undertaken using Standardized Monitoring, Assessment, Relief and Transition (SMART) Methodology for both the anthropometric and retrospective mortality surveys.
Additional data (IYCF, WASH and food security) was gathered at the household level using structured Nutrition Cluster questionnaires.

2.1 Sample Size Calculation Anthropometry and Mortality

The sample size for the nutrition survey was determined using ENA for SMART software (version 2011 (July 9th, 2015[1]).The following assumptions based on the last year (2016) survey results and SMART recommendations were made to obtain the number of children, mortality population and households to be included in the survey.

Table 2: Anthropometric and Mortality Sample Size Calculations

Parameters/values	Anthropometric survey	Mortality survey	Rationale/ Source
Estimated prevalence / Death Rate	25.6 %	0.42	Based on the results from SMART Survey conducted in May 2016
± Desired precision	4.5 %	0.3	From SMART Nutrition Survey Guideline
Design effect	1.5	1.5	Based on SMART guidance
Recall period in days		90	SMART default recall period
Percent of U5 children	21.0 %		Results from SMART Survey conducted in May 2016
Average household size	7.4	7.4	
Percent of non-responsive households	5 %	5 %	
Sample size	590 children	3253 people	
	444 HHs	463 HHs	

The two surveys (anthropometry and mortality) produced different household samples sizes, mortality sample size (463) was then used for both anthropometry and mortality surveys. Based on current situation and previous experience on the survey area, it was clear that 14 households can be visited by one team per day. The total number of clusters obtained after dividing the total number of households (463/14) was 33.1 (when rounded up gives 34 clusters).
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[1] Smartmethodology.org website

2.2 Cluster Sampling Strategy

2.2.1 First Stage Sampling- Selection of Clusters

The first stage was the selection of clusters which used the probability proportional to population size (PPS). Villages were considered as the smallest geographical unit/primary sampling unit. The population data used was obtained from the local authorities (Relief and Rehabilitation Commission RRC). All villages and their total populations were entered in the ENA for SMART software (July 9th, 2015 update version), the software randomly assigned the clusters to the villages, based on their respective population sizes. A total of **34** clusters was selected from the sampling frame generated from the list of all villages in all 7 Payams of Abiemnom County.

2.2.2 Second Stage Sampling- Selection of Households

Household definition: household was defined as group of people living under same roof & sharing food from the same pot. In home with multiple wives, those living and eating in different houses are considered as separate households. Wives living in different houses and eating from same pot are considered as one household. One cluster was assigned 14 households to be visited per day. Simple random sampling was used in the final selection of households. A list of households was drawn with the help of local leaders, who knew the names of all ladies in the households that fall in their villages.

2.2.3 Case Definitions

Acute malnutrition rates are estimated from both weight for height (WFH) index values and the presence of oedema. The WFH indices are expressed in Z-scores according to WHO 2006 and NCHS 1977 reference standards as presented in the table 5 below;

Table 3:: Nutritional Status indicators and cut-offs used

Indicator		Children 6-59 months
Acute Malnutrition1	*Global Acute Malnutrition (GAM)*	*WHZ <-2 Z-score and/or oedema
	Moderate Acute Malnutrition(MAM)	WHZ <-2 and ≥-3 Z-score
	Severe Acute Malnutrition (SAM)	WHZ <-3 and/or oedema
Stunting1	Stunting	**HAZ <-2 Z-score
	Moderate	HAZ <-2 and ≥-3 Z-score
	Severe	HAZ <-3 SD Z-score
Underweight1	Underweight	***WAZ <-2 Z-score
	Moderate	WAZ <-2 and ≥-3 Z-score
	Severe	WAZ <-3 Z-score
Acute Malnutrition (based on MUAC)	At risk of malnutrition	MUAC <135 mm and ≥125 mm
	Moderate malnutrition	MUAC≥115mm and MUAC<125mm
	Severe malnutrition	MUAC<115 mm

Calculated using WHO 2006 standard; *WHZ: weight-for-height z-score, **HAZ: height-for-age z-score, ***WAZ: weight-for-age z-score

Table 4: Summary of Mortality Rate Cut-off Levels

Crude Mortality Rate (CMR):		Under Five Mortality Rate (U5MR)	
Alert level	1/10,000 people/day	Alert level	2/10,000 people/day
Emergency level	2/10,000 people/day	Emergency level	4/10,000 people/day

2.3 Inclusion and Exclusion Criteria

All children of 6 to 59 months were included in the anthropometric survey. Calendar of events produced using the local events was used to determine the ages of children. Some children were measured lying down when their heights were greater than or equal to 65cm and less than 87cm while others were measured standing when their heights were greater than or equal to 87cm and less than or equal to 110cm.

All selected households were included in mortality survey regardless of whether there were or there were no eligible children of 0 to 59 months. This was important as those households remain part of the survey.

All children 0-5 months were excluded from anthropometric survey. Infant and young child feeding questionnaire was not administered in households without children 0-23 months. All respondents who refused to be interviewed were left out of the survey.

2.4 Questionnaire

All the questionnaires were written in English however, interviews were conducted in Dinka language as the respondents were not conversant with English. During the training, translation of English language was done and repeated to ensure consistency with translation by the enumerators. Additionally before the fieldwork begins, all the questionnaires were pre-tested to ensure that the enumerators had understood the questionnaires and able to collect data from the community. The pre-testing village was one of the unselected villages during cluster selection.

Apart from those questionnaires, the SMART standardized training package was utilized in the training of surveyors as well as the fieldwork.

2.4.2 Mortality Questionnaire

The data required for estimating the death rates were collected using the SMART mortality survey form and 90 days recall period. The beginning of recall period was marked by 12th of February 2017 which meant that there was minor variation in the recall period across the days of the survey. Each sampled household was asked the individuals who slept in the house during the previous night and those who slept in the house on the 12th of February. The people who have joined the household after the 12th of February and those that have died in the household since 12th of February to 12th May 2017. Demographic information recorded included; Sex and age. The mortality questionnaire was administered in all sampled households, regardless of whether there were or there were no children of 0-59 months present.

2.4.2 Food Security & Livelihoods and WASH

Food security and WASH questionnaires were administered to head of household and or the spouse in the same households where mortality data was collected. Key information gathered using food security questionnaire include crop and livestock production, household food consumption, food sources, dietary diversity, household hunger situation, income and expenditure and coping strategies, The data collected was used in the following ways;
- Analysis of crop and livestock production practices and ownership structure and contribution to food security and livelihoods;
- Dietary diversity score based on 8 food groups.

While WASH questionnaire was used to collect information on main source of drinking water, total distance to and from source of water, household water consumption, water treatment, hand washing and human waste disposal.

2.4.3 Infant and Young Child Feeding (IYCF)

This questionnaire was administered in households with children from 0 to 23 months, mainly to investigate time of breast feeding initiation after delivery, feeding with colostrum, exclusive breast feeding and continued breast feeding at 1 year and 2 years respectively as well as meal frequency and diversity. Also assessed under same questionnaire are pregnant and lactating mothers.

2. 5 Training, Supervision and Survey Teams

The training of the survey team was conducted by the Survey Consultant in collaboration with CARE South Sudan Nutrition Program Team in Abiemnom County. The training focused on aspects of the survey implementation, objectives, survey methodology (including household selection, Mid-Upper Arm Circumference (MUAC), height and weight measurements) as well as the administration of food security & livelihoods and infant and young child feeding (IYCF) questionnaires. Standardization test was done at the end of training on 10 children. A pre-test (pilot test) was done on the last day with each team visiting 3 households. The training lasted for 4 days. Six survey teams were later formed; each comprising of a team leader and two data collectors. They were organized based on the ability of each enumerator to perform specific task. Each team surveyed one cluster per day targeting a maximum of 14 household.

The performance of each survey team was monitored on a daily basis and the teams were informed on how they should improve the quality of the data every morning before departing to field. Supervision was done by the Consultant with help of two CARE Nutrition staff.

2.6 Data Entry and Analysis

Data Entry for anthropometric was done on daily basis.The anthropometric and mortality data were entered and analyzed using Emergency Nutrition Assessment (ENA) Software. Plausability check was the main test run to check the overall data quality. This was done on daily basis to ensure the quality of data collected was good and feedback was given to each team, each day before departing to the field. Anthropometric outliers were excluded based on [-3SD to 3SD for WHZ, from the observed WHZ mean]

In assessing the nutritional status of children 6-59 months old, data on immediate and underlying causes of malnutrition such as disease, health seeking behavior and food security and livelihood indicators were analyzed. The food security and IYCF data were entered in Excel and analyzed in both Excel and EPI INFO version3.5.3.

3.1 Anthropometry (WHO Standards 2006)
Acute malnutrition rates are estimated from both weight for height (WFH) index values and the presence of oedema. The WFH indices are expressed in Z-scores according to WHO 2006 and NCHS 1977 reference standards.
A total of 689 children aged 6-59 months were assessed for their nutritional status using anthropometric measurement. However 13 children were excluded from the final analysis due to out of range values using SMART flags (-3 to 3 Z-score for WHZ). Overall, the mean weight-for-height index was negative (mean ± SD of WHZ: -1.38±1.08) indicating that children in the surveyed population are affected by acute malnutrition (wasting). Among the sampled children, 368 (53.4%) were boys while 321 (46.6%) were girls. The overall sex ratio of the surveyed children was 1:1 indicating that both sexes were equally represented within the sample (sex ratio should be between 0.8-1.2). The sex and age pyramid of children 6-59 months of age sampled during the survey is presented below in figure 1

In figure 1 below, there is remarkable under representation of girls in the sample population structure appearing in 54-59 months and another under representation for boys in the age sample population structure appearing in 30-41 and 42-53 months. This can be explained by age estimation problems by mothers. The results of this analysis are presented in figure 1 and the table 8 below.

Figure 1: Population age and sex pyramid

Figure 1: Population age and sex pyramid
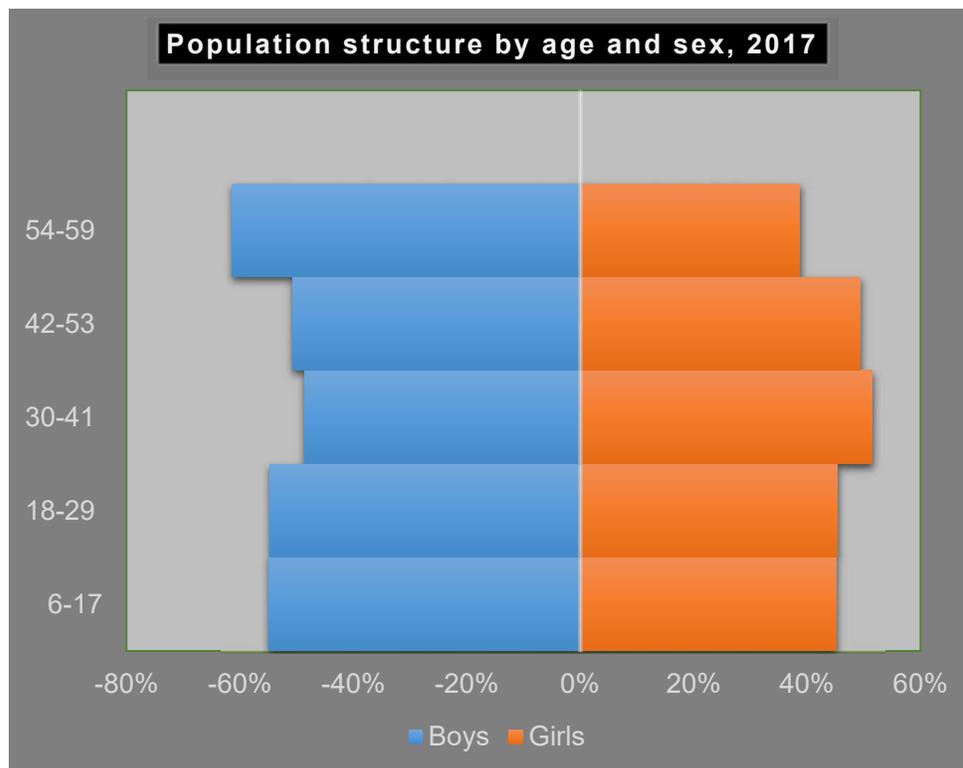
Table 5: Distribution of age and sex of sample

Age grouops in months	Boys		Girls		Total		Sex Ratio
	N	%	N	%	N	%	
6-17	96	54.9	79	45.1	175	25.4	1.2
18-29	88	54.7	73	45.3	161	23.4	1.2
30-41	69	48.6	73	51.4	142	20.6	0.9
42-53	69	50.7	67	49.3	136	19.7	1.0
54-59	46	61.3	29	38.7	75	10.9	1.6
Total	368	53.4	321	46.6	689	100.0	1.1

3.2 Nutritional Status of Children 6-59months in Abiemnom County

The use of National Centre for Health Statistic (NCHS) reference was after sometime observed to be inapplicable in some parts of the world due to different heights found among different children in most continents. WHO then came up with harmonized standard in 2006. This standard was based on data collected from children of different background all over the world. This made WHO standard to be most preferred as compared to NCHS. Unlike NCHS reference which use percentage of median, WHO standard use z-score to determine the nutritional status of the children.

The malnutrition levels unveiled by this survey indicate GAM rate above the WHO [15.0%] emergency level. The prevailing GAM and SAM rates for Abiemnom County are 20.1 % [17.2 - 23.4 95% C.I.] and 5.2 % [3.8 - 7.0 95% C.I] respectively. There was no oedema case reported in the study.

3.3 Distribution of Acute Malnutrition in Z-score, WHO references

In the last few years, weight for height index had been used to measure wasting among the population, mostly in nutrition surveys. The reason being that the Z-score expression takes into account the standard deviation of the distribution and thus standardizes weight deficiencies, regardless of the height of the child. Median height-for-age and weight-for-age are also calculated without taking into account the distribution around the median in the reference population. Moreover, the Z-score is a more statistically valid comparison to the reference population than the percentage of the median. When using Z-scores, all malnourished children, regardless of age and/or height, are likely to be actually classified as malnourished.

Since the percentage of the median only uses two factors to calculate malnutrition, as opposed to the three factors used in Z-score calculations, percentage of the median has less likelihood of capturing all the malnourished children. Therefore, when Z-scores are used to define malnutrition, the number of children classified as malnourished is higher than if the percentage of the median is used, and it is a more statistically uniform approach to defining malnutrition.

The information presented in anthropometric discussions below is based on the SMART flags exclusion. 38 out of 689 children were flagged based on WFH, WFA and HFA, 27 children were then excluded from the final analysis based on WFH index.

The table 9 below shows the distribution of acute malnutrition by sex in z-score and/or oedema as per WHO standards. The proportion of malnourished children according to global and severe acute malnutrition is 20.1 % [17.2 - 23.4 95% C.I.] and 5.2 % [3.8 - 7.0 95% C.I] respectively. Those rates could increase during the hunger gap period if the situation

promoting malnutrition at the household level does not change. The current moderate cases 14.9% [12.2-18.2 95% CI] could possibly progress to severe malnutrition.

Table 6: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 676 (95% CI)	Boys n = 361 (95% CI)	Girls n = 315 (95% CI)
Prevalence of GAM (<-2 z-score and/or oedema)	(136) 20.1 % [17.2 - 23.4]	(78) 21.6 % [17.2 - 26.7]	(58) 18.4 % [14.3 - 23.5]
Prevalence of MAM (<-2 z-score and >=-3 z-score, no oedema)	(101) 14.9 % [12.2 - 18.2]	(58) 16.1 % [12.0 - 21.1]	(43) 13.7 % [10.3 - 17.9]
Prevalence of SAM (<-3 z-score and/or oedema)	(35) 5.2 % [3.8 - 7.0]	(20) 5.5 % [3.5 - 8.7]	(15) 4.8 % [3.0 - 7.6]

Further analysis of the WHZ was done based on the presence of and/or absence of bilateral oedema. All malnourished children in the surveyed sample suffered from marasmus as indicated by table 10 below. Kwashiorkor and Marasmic kwashiorkor were not found.

Table 7: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

		<-3 z-score	>=-3 z-score
Oedema present		Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
		Marasmic No. 41 (6.0 %)	Not severely malnourished No. 648 (94.0 %)

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Figure 2: Prevalence of Global Acute Malnutrition distribution curve (WHO 2006 references)
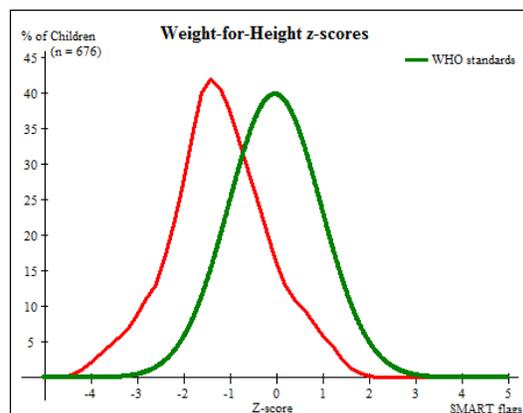
Figure 2 shows the weight for height distribution curve of the anthropometric survey (in red). The figure compares the results with the WHO standards that follow a normal distribution (in green). In this figure, the curve for the sample population has shifted to the left, indicating a poorer nutritional status than the reference population, which is confirmed by the mean of -1.22. The standard deviation is 1.06, which is an indication that the collected data fall within the acceptable range of 0.8-1.2.

3.4 Prevalence of Malnutrition Based on MUAC cut off's (and/or oedema) and by Sex
During the survey fieldwork, MUAC was taken on children of 6-59 months old. The height considered for MUAC was >=65 cm and <= 110cm. Taken between the midpoint of acromion process of scapula and olecranon process, MUAC is a good measure of muscle/subcutaneous fat which indicates the current nutritional status of children.

Abiemnom County survey results showed 13.6 % [10.2 - 18.0 95% C.I] for global acute malnutrition [GAM] while 2.3 %(1.1 - 5.0 95% C.I] were severely malnourished {SAM}. In the category of moderate acute malnutrition {MAM}, the result is11.3 % [8.8 - 14.5 95% C.I]. The table below is the presentation of sample based on MUAC. Table 11 below show the results.

Table 8: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

	All n = 689 95% CI	Boys n = 368 95% CI	Girls n = 321 95% CI
Prevalence of GAM (< 125 mm and/or oedema)	(94) 13.6 % [10.2 - 18.0]	(40) 10.9 % [8.1 - 14.5]	(54) 16.8 % [11.4 - 24.2]
Prevalence of MAM (< 125 mm and >= 115 mm, no oedema)	(78) 11.3 % (8.8 - 14.5]	(33) 9.0 % [6.8 - 11.7]	(45) 14.0 % [9.6 - 20.1]
Prevalence of SAM (< 115 mm and/or oedema)	(16) 2.3 % [1.1 - 5.0]	(7) 1.9 % [0.8 - 4.6]	(9) 2.8 % [1.2 - 6.7]

3.5 Prevalence of Underweight

Neither stunted nor wasted children weigh as much as normal children of the same age. *Weight-for-age* is thus a composite index, which reflects both wasting and stunting, or any combination of both. In practice, about 80% of the variation in WFA is related to stunting and about 20% to wasting. It is *not* a good indication of recent nutritional stress.
It is used because it is an easy measurement to take in practice, and can be used to follow individual children longitudinally in the community.

Underweight status reflects current and past nutritional experience in community. It is a good measure of both wasting and stunting, and is quite useful in child growth monitoring. As in the survey results, underweight accounted for 24.4 % [19.3 - 30.2 95% C.I.)] for GAM with severe underweight at 5.8 % [4.1 - 8.3 95% C.I].Table 12 below shows underweight results

Table 9: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 685	Boys n = 365	Girls n = 320
Prevalence of underweight (<-2 z-score)	(167) 24.4 % (19.3 - 30.2 95% C.I.)	(102) 27.9 % (22.6 - 34.1 95% C.I.)	(65) 20.3 % (14.4 - 27.9 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(127) 18.5 % (14.6 - 23.2 95% C.I.)	(77) 21.1 % (16.7 - 26.3 95% C.I.)	(50) 15.6 % (11.4 - 21.1 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(40) 5.8 % (4.1 - 8.3 95% C.I.)	(25) 6.8 % (4.5 - 10.3 95% C.I.)	(15) 4.7 % (2.5 - 8.7 95% C.I.)

3.6 Prevalence of Stunting [Chronic Malnutrition]

Growing children get taller, and the height of a child in relation to a "standard" child of the same age gives an indication of whether the growth has been normal or not. This index of growth is called *height-for-age.* Children who have a low HFA are referred to as stunted. Growth is a relatively slow process, and if a child of normal height stops growing it takes a long time for that child to fall below the cutoff point for stunting. For this reason, HFA is often used to indicate long-standing or chronic malnutrition.

The overall stunting rates in this survey showed that 20.0 %[16.4 - 24.1] of the children in the study are stunted and 4.6 % [3.0 - 7.0]] severely stunted, however, the result is below the emergency level. Table 13 below shows the results.

Table 10: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 668	Boys n = 360	Girls n = 308
Prevalence of stunting (<-2 z-score)	(132) 19.8 % (16.0 - 24.2 95% C.I.)	(78) 21.7 % (17.2 - 26.9 95% C.I.)	(54) 17.5 % (12.9 - 23.3 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(108) 16.2 % (13.0 - 20.0 95% C.I.)	(63) 17.5 % (13.8 - 21.9 95% C.I.)	(45) 14.6 % (10.3 - 20.3 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(24) 3.6 % (2.2 - 5.7 95% C.I.)	(15) 4.2 % (2.6 - 6.7 95% C.I.)	(9) 2.9 % (1.2 - 6.7 95% C.I.)

3.7 Child Nutritional Status

WHO Child Growth Standards guidelines were used to categorize nutritional status of the surveyed children. SMART flags on (-3SD to 3SD for WHZ) from the observed survey mean were used to exclude extreme values. Table 11 shows the Z-scores, design effect, and the number of children with flag signs and were excluded in the analysis.

Table 11: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	676	-1.22±1.06	1.00	0	13
Weight-for-Age	685	-1.38±1.01	2.67	0	4
Height-for-Age	668	-1.02±1.14	1.69	0	21

* contains for WHZ and WAZ the children with oedema.

3.8 Nutritional Status of Pregnant and Lactating Mothers (PLWs)

During field work data collection, MUAC for pregnant and lactating mothers of <6 months old children was taken. Like children of 6 to 59 months, this was to determine their nutrition status as they are too a vulnerable groups. Those PLWs with MUAC <230mm are considered malnourished while those with MUAC <210mm are considered severely malnourished. Among the assessed 314 pregnant and lactating mothers of children <6 months, 28.3% (89) were malnourished while 5.4% (17) were severely malnourished. Poor nutritional status among pregnant and lactating mothers can lead to adverse effects on their babies, as they are not able to provide them with necessary nutrients.

3.9 Mortality

A 90 days recall period was employed during data collection for mortality survey. The crude mortality rate 0.22(0.08-0.59 95% CI) and under five mortality 0.31(0.07-1.28 95% C.I) rate were calculated from the figures collected from all households surveyed.

During the survey, a total of 3627 people were present in the assessed households. Of the total population 811 [22.4%] were children below the age of five years. 72 people had joined the various households while 192 had left within the last 3 months.

47 live births had taken place in the past 3 months and a total of 8 people in the general population were reported dead, 3 of which were children below five years. The resultant design effects for crude mortality rate was 1.53 and that of under-five mortality rate was 1.0.Thus the retrospective mortality rates are as presented in table 16 below:

Table 12: Mortality rates and data

Parameters for Mortality	Results (CI 95%)
CMR (deaths per 10 000/day	0.22(0.08-0.59 95% CI)
U5MR (deaths in children <5/10 000/day	0.31(0.07-1.28 95% C.I)
Persons recorded within recall period	3627
Current residents <5 years old	811
Mean household size	7.7
Total deaths during the recall period	8
Total deaths during the recall period <5 years old	3
Recall Period (days)	90
Cause of death	Percent
Injury	12.5
Illness	75.0
Unknown	12.5
Location of death	Percent
In current location	75.0
During migration	25.0

3.10 Health

Presence of disease results in lowered immunity, mucosal damage, and exacerbates the loss of nutrients. This in turn affects the nutritional status of an individual. Therefore poor health status of the children plays leading role in promoting malnutrition. Health indicators assessed in this survey included immunization and vitamin A supplementation, prevalence of illness and health seeking behaviours. Others are deworming and mosquito net utilization.

3.10.1 Immunization, Vitamin A supplementation, Deworming and Mosquito Net Utilization

Mothers/caretakers were asked whether the child received measles vaccine and Vitamin A. Of all 644 children (9-59 months), **79.1**% had received measles vaccination confirmed by both EPI card and mother recall. Vitamin A supplementation in the last 6 months recorded 75.6%,

Deworming is an important activity as it protect children from intestinal worm infections. The protection subsequently reduce the deterioration of malnutrition levels among the children

less than five years. Percent of children under five years who received deworming tablets according to this study is 41.2%. Mosquito net use is central to malaria prevention, however, Abiemnom Community results of three surveys conducted during the pre-harvest seasons of the last three years have continue to show less than 50% of households use of mosquito nets, A nutrition survey conducted in the same place last November recorded 82.3% households to have used the nets. This might point to the fact that mosquito net is commonly used in this area during wet seasons. Current results stand at 38.9%.The results are presented in table 17 below.

Table 13: Immunization, Vitamin A, Deworming and Mosquito net results

Parameters	n= Yes	N	%	(95% CI)
Vitamin A (6-59 months)	521	689	75.6	72.2 – 78.7
Measles Vaccination (9-59 months)	545	644	79.1	75.8 - 80.0
Dewormed (12-59 months)	245	595	41.2	37.2 – 45.3
Mosquito Net use (6-59 months)	268	689	38.9	35.3 – 42.7

3.10.2 Child Morbidity Results

Prevalence of incidence of illness was reported in 51.5% children of 6-59 months surveyed. Predominant symptoms were diarrhoea (31.5%), fever (25.2%) and cough (24.9%). Results are presented in tables 19 below.

Table 14: Prevalent of illness

Parameters	n= Yes	N	%	(95% CI)
Prevalence of illness	355	689	51.5	47.7-55.3
Diarrhoea	139	441	31.5	27.3 – 36.1
Fever	111	441	25.2	21.2 – 29.5
Cough	110	441	24.9	21.0 – 29.3
Others	81	441	18.4	14.9 – 22.4

3.10.3 Health Seeking

Most common primary seeking treatment option in Abiemnom County is primary health care centre (86.2%). Figure 3 below shows the results for various areas people seek treatment from.

Figure 3: Health Seeking Options
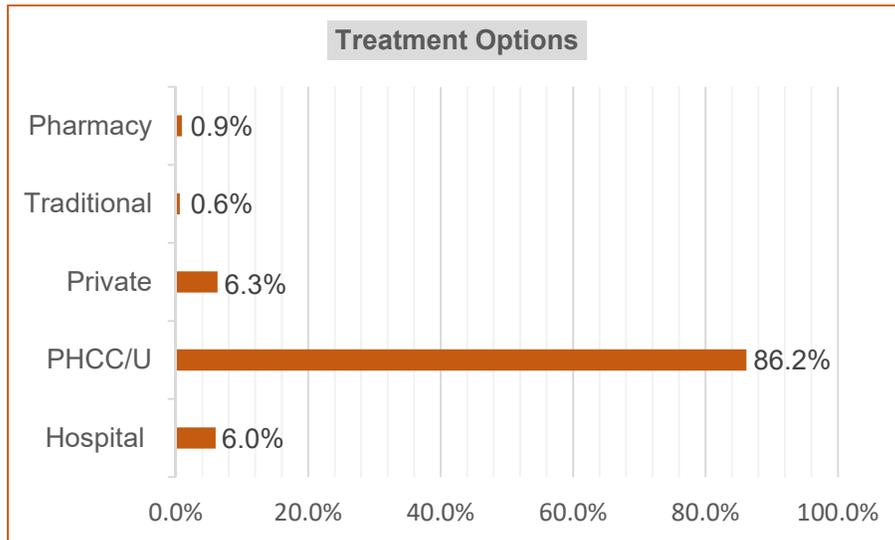
4.0 Infant And Young Child Feeding (IYCF)

4.1 Exclusive Breast Feeding and Other Breast Feeding Proxy Indicators

Infant and young child feeding (IYCF) practices for children in the age category of 0–23 months may influence the nutritional status of children and subsequence growth and development or survival. To understand IYCF practices based on the context of Abiemnom County, Mothers of children from 0 to 23 months were asked questions based mainly on proxy indicators on breastfeeding such as initiation, exclusive breastfeeding, continued breastfeeding, introduction of complementary food, and food frequency were included in this study.The results shown that 96.8% of all the 0-23 months old children were ever breastfed.

Exclusive breastfeeding for the first 6 months is important to children as colostrums and breast milk protect the child from diseases. This is complemented by timely initiation of complementary feeding. When those two practices are well implemented, they continue to have good impact throughout childhood growth and development. According to the results from the mothers of children in the age group of less than 6 months, exclusive breast feeding is not properly practiced in the surveyed area as only 50% of the households were able to comply with exclusive breast feeding practices. 86.1% of the children (0-23months) were introduced to breast feeding immediately within one hour of delivery while 92.7% where still breast feeding at the time of data collection. The results are displayed in the following chart 4 below.

Figure 4: Breast feeding indicators
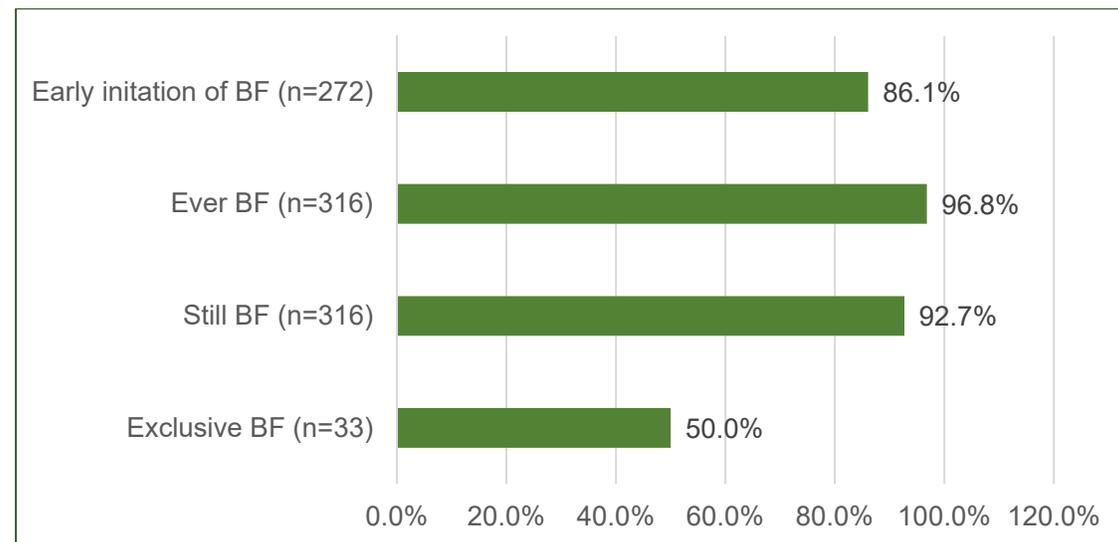
4.2 Complementary Feeding and Continued Breast Feeding at 1 & 2 years

Complementary feeding help provide nutrients that mother's milk cannot provide when the child reached 6 months. In addition, rapid growth and development need more nutrients to speed up the process. The analysis for the data of children for complementary feeding (6-8 months) showed that (33.3%) received solid, semi-solid or soft food the previous day.

World Health Organization recommended continued breast feeding up to two years, however, this is not likely the case in Abiemnom Community as continued breast feeding seemed to reduce among children when progressing towards two years. The results in Figure 5 shows the different between continued breast feeding at 1 year and 2 two years respectively.

Figure 5: Continued Breast Feeding at 1 &2 Years
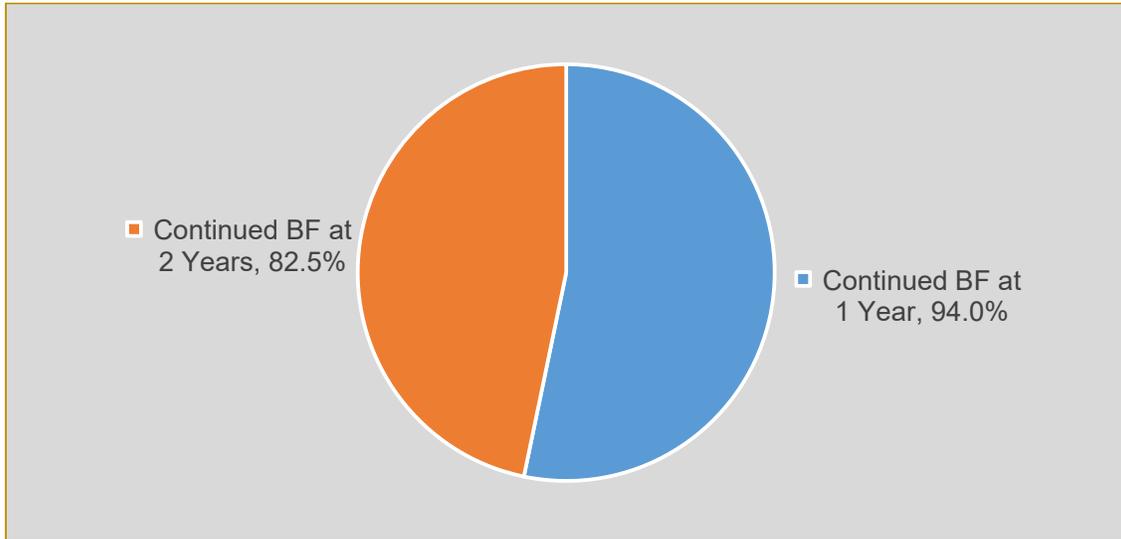
4.3 Minimum Meal Frequency, Minimum Dietary Diversity and Minimum Acceptable Diet

Results of the minimum meal frequency and dietary diversity of breastfed and non-breastfed children 6-23 months of age are presented in table 29 below. The dietary diversity indicator is based on the fact that the more complex the diets are, the more nutrients the diet will provide for the rapid growth and development of young child. The results of the survey showed that 21.0% breast fed children received food from 4 or more food groups during the previous day (MDD) while 17.5% of 6-23 months breast fed children reported to have received solid, semi-solid or soft foods the minimum number of times or more during the previous day (minimum meal frequency). Non breast fed children (9.5%) of 6 to 23 months were fed from 4 or more good groups (minimum dietary diversity) while same number (9.5%) received solid, semi-solid or soft foods or milk feeds the minimum number of times or more during the previous day (minimum meal frequency. However, for minimum acceptable diet, (4.8%) breast fed children of 6 to 23 months at least minimum dietary diversity and the minimum meal frequency during the previous day while non-breast fed children in same age category received non from minimum acceptable diet. The results are presented in table 29 below.

Table 15: Minimum meal frequency, minimum diversity diet and minimum acceptable diet

Indicator		Age group	n	%	95% CI
Minimum dietary diversity	Proportion of breastfeeding children who fed from ≥4 food groups N=229	6-23	48	21.0	15.9-26.8
	Proportion of non-breastfeeding children who fed from ≥4 food groups, N=21	6-23	2	9.5	1.2 – 30.4
Minimum meal frequency	Proportion of breastfeeding children who received solid, semi-solid, or soft foods 3 or more times per day, n=229	6-23	40	17.5	12.8-23.0
	Proportion of non-breastfeeding children who received solid, semi-solid, or soft foods 4 or more times per day, n=21	6-23	2	9.5	1.2 – 30.4
Minimum acceptable diet	Proportion of breastfeeding children who received meal frequency of 3 or more times per day and from 3 or more food groups), n=229	6-23	11	4.8	2.3 – 8.4
	Proportion of non-breastfeeding children who received meal frequency of 4 or more times per day and from 3 or more food groups), N=21	6-23	0	0.0	0%

It is clear that non breast fed children might not be getting the attention they deserved when it come to their feeding. Mothers might not be aware of importance to feed the non-breast fed regularly, this therefore call for effective community awareness to sensitize mother about it.

Table 16 below show frequency of eating per food group and the percent of under-five that has eaten specific food group. It is clear from this analysis that important food items such as vitamin A rich fruits and vegetables as well as eggs are least eaten by children.

Table 16: Mean food groups consumed by children under five

	n	Mean foodgroup consumed	Percent of under five
Cereals group	43	0.3	13.6%
Legumes	35	0.3	11.10%
Dairy	41	0.4	13.0%
Flesh foods	56	0.5	17.7%
Eggs	15	0.2	4.7%
Vit A fruits/veggies	10	0.1	3.2%
Other fruits/veggies	18	0.1	5.7%

5.1 Water Access

Common source of drinking water used by households in Abiemnom County is borehole (98.5%). The type of water source used around this area depends more on its accessibility in terms of distance and time than safety of water at the source. Household water consumption is also low. According to the survey results, an average household of 7.7 people have an average water of 96.3 litres, meaning one person have an average of 12.5 litres of water. This is little below the recommended SPHERE minimum standards of 15 litres of water per person per day, which can increase depending on the availability of water, local use and climatic conditions of the area.

Figure 6: HH Main Source of Drinking Water
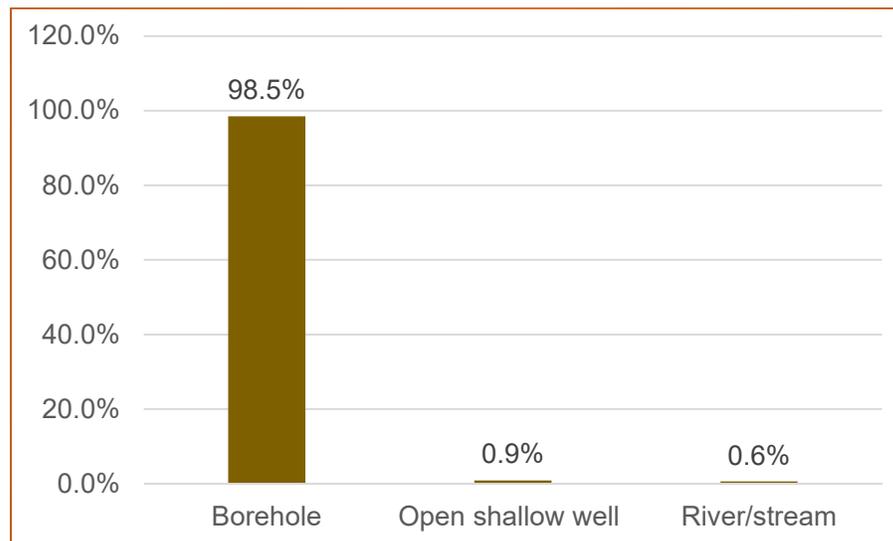
Results from sampled households show that, 49.8% (234hhs) travels less than 30 minutes to access water, 34.7% (163) travel 30 minutes to one hour while 13.0% (61) take one to two hours to reach their source of water. Some households 2.6% (12) travel for two to four hours to get water for household use. Figure 6 below present the result of main drinking water sources in the county

Table 17: Water treatment

	n	Percent	95% CI
Nothing	335	71.3%	66.9-75.3
Boiling	31	6.6%	4.6-9.3
Filter with cloth	62	13.2%	10.3-16.7
Letting it settle	30	6.4%	4.4-9.1
Chemicals	12	2.6%	1.4-4.5
Total	470	100.0%	

Water Treatment

Most households (71.3%) do not treat their water collected either from safe or unsafe sources at household level before drinking. Few households 13.2% filter their water with cloth, 6.6% boil water and another 6.4% leave dirt to settle before it is decanted and used. This shows that water treatment practices at the household level are poor, which seems to indicate a high consumption of unsafe water and might be the reason why there are some cases of diarrhoea recorded during data collection. Table 17 shows the results of water treatment.

5.3 Sanitation and Hygiene

A considerable proportion of the community 61.7% (290) latrine and 36.2% (170) use designated and undesignated areas for defecation. Few households use 2.1% (10).

Among the surveyed households, most respondents wash their hands during four main occasions, before cooking 63.0%, after defecating 22.2%, before eating 21.8%, after feeding baby 12.8, and after cleaning baby0.9%.

Figure 7: Hand Washing Time
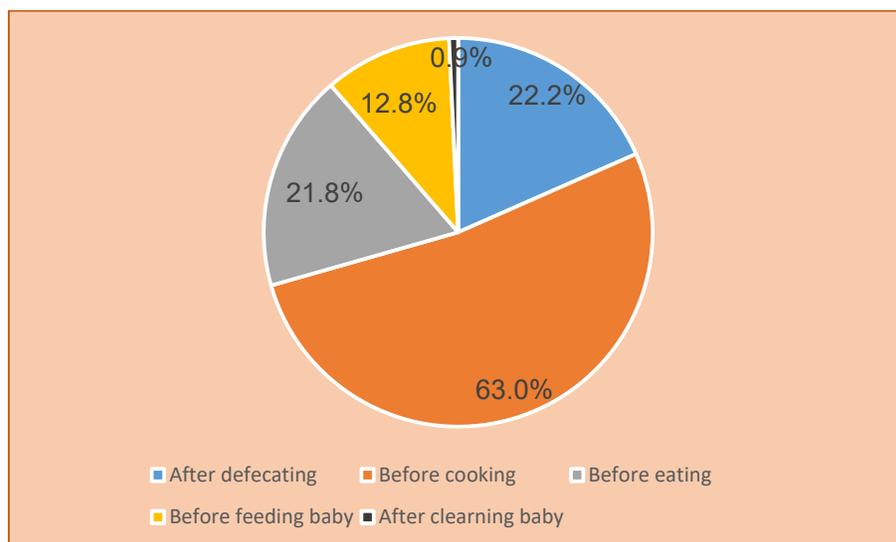
In the whole sample surveyed, 63.2% reported to have used soap when washing their hands, 19.8% use water only and 9.8% used water plus ash to wash their hands. This uneven use of soap highlights unhealthy hygiene behaviors for some of the people in the community. Sanitation and hygiene are critical to health, survival, and development. Lack of basic sanitary facilities coupled with the poor hygiene practices and lack of access to improved drinking water sources makes the communities vulnerable to malnutrition and diseases. Below are the results in table 18.

Table 18: Hand Washing Practices

	n	%	95% CI
Nothing	34	7.23%	5.1 - 10.1
Water	93	19.79%	16.3 - 23.7
Water + soap	297	63.19%	58.6 - 67.5
Water + ash	46	9.79%	7.3 - 12.9
Total	470	100.00%	

6.0 Results Of The Food Security And Livelihoods

6.1 Socio-Demographic Characteristics of Households
Most households in Abiemnom County are headed by male heads 68.7% (323) and female heads 31.3% (147). Majority of the population are residents 95.1% (447), returnees 2.3% (11) and refugee 2.6% (12). There are a total of 3505 people living in 470 households at 7.5 persons per household.

In terms of animal production, 50.6% (238) households reported during data collection that they had cattle while 73.6% (346) households had cultivated in the last planting season.

From the fighting of 15th December 2013, 26.2% (123) households have seen large decrease in the number of cattle they own, 12.6% (59) saw small decrease while 14.5% (68) households' cattle remained same. A staggering 43.1% (202) households answered no as they did not own cattle. Table 17 below show the summary of results;

Table19: Fighting effects on cattle

Cattle raiding	n	%	95% CI
No	202	43.1%	38.6 - 47.7
Large decrease	123	26.2%	22.3 - 30.5
Small decrease	59	12.6%	9.8 - 16.0
Remained same	68	14.5%	11.5 - 18.1
Small increase	11	2.3%	1.2 - 4.3
Large increase	6	1.3%	0.5 - 2.9
Total	469	100.0%	

Majority of households obtain their income from various sources, however, salaried work and sale of crops are the two leading main income generating activities as can be seen in the ranking by households below in table 18.

Table 20: Main Source of Household Income in Past 30 days

Source	Value
No income	83
Sale of crops	111
Sale of livestock	22
Sale of alcoholic beverages	16
Sale of fish	3
Sale of natural resources	14
Sale of food aid	4
Casual labour	10
Skilled labour	13
Salaried work	154
Petty trading	14
Family support	17
Remittance	9

Respondents were asked about the main source of food they ate in the past 7 days, the results as showed in Figure 6 revealed own production (58.1% as the common source of food for many households.

Figure 8: Main Source of Household Food in the Past 7 Days
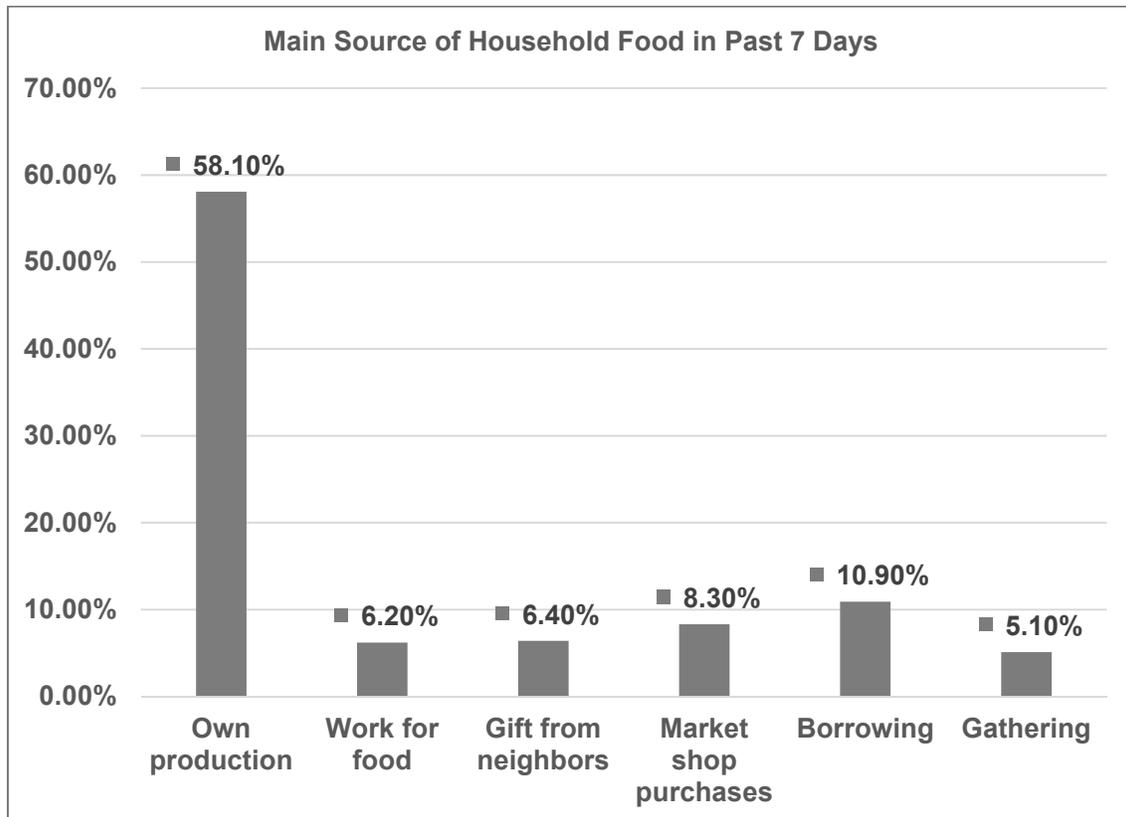
6.2 Food Consumption Score (FCS)

Food consumption score is the frequency weighted diet diversity score or food consumption score is a score calculated using the frequency of consumption of different food groups consumed by a household during the 7 days before the survey. Specific standard weights for each of food groups that comprise the food consumption score.

The mean food consumption score for all the households or the population assessed is 35.6. This classify Abiemnom County food security at acceptable food consumption. Table 20 below shows the results.

Table 21: HH Food Consumption Score

FCS N=470	n	%	95% CI
Poor (FCS 0-21)	96	20.4	16.9-24.4
Borderline (FCS 21.5-35)	158	33.6	29.4-38.1
Acceptable (FCS >35)	216	46.0	41.4-50.6

In countries where sugar and oil are eaten almost on daily basis, a different threshold can be used. In Abiemnom County, sugar and oil are commonly used. This then necessitate the use of this threshold which consider the two food items. The mean for both thresholds remain same however, classification of the county have changed from acceptable (FCS >35) to borderline (FCS 28.5-42). Table 22 below present the results.

Table 22: HH Food Consumption Score

Thresholds with oil and sugar eaten on daily basis (FCS N=470)	n	%	95% CI
Poor (FCS 0-28)	170	36.2%	31.9-40.7
Borderline (FCS 28.5-42)	157	33.4%	29.2-37.9
Acceptable (FCS >42)	143	30.4%	26.3-34.8

Table 23: Average number of days, # of households and percent of HHS who ate foods

	Food Group	Average no.of days	Number of households	Percent
1	Cereals	5.6	422	89.8%
2	Pulses	0.8	230	48.9%
3	Vegetables	1.9	271	57.7%
4	Fruits	0.7	139	29.6%
5	Flesh foods	2.8	398	84.7%
6	Milk	1.4	255	54.3%
7	Sugar	1.7	246	52.3%
8	Oil/fats	2.9	354	75.3%

6.3 Household Hunger Scale

Household Hunger Scale (HHS) is a new and easy indicator to measure household hunger in food insecure areas or poverty stricken localities. The method was applied in Abiemnom Nutrition Survey.

The 50th percentile or the median value of all the households is 2 or 235.5. This mean that 50% of the households fall above and 50% fall below the median value (2 or 235.5). In the table below, this value is found in the household hunger score (2-3) and household hunger category of moderate hunger in the household.

Table 24: Household Hunger Scale

Household hunger score	Number of HHs	Household Hunger Category
0-1	177	Little to no hunger in the household
2-3	231	Moderate hunger in the household
4-6	62	Severe hunger in the household

7. DISCUSSION

7.1 Anthropometry
Based on the plausibility report, the sex ratio showed that boys and girls are equally represented with p-value 0.073, however, boys are still slightly more than girls. Overall age ratio from 6-29 and 30-59 months is insignificance with value of 0.95 and p-value 0.137.
Acute malnutrition is high with GAM of 20.1% (17.2-23.4 95% CI] and SAM of 5.2% (3.8- 7.0 95% CI]. In comparison with last year survey results whose GAM was 29.2% [25.6-33.2 95% C.I] and SAM was 8.0% [6.2-10.2 95% C.I], the situation remain at critical or at emergency level. Results of surveys conducted same time recently in neighbouring counties of Mayom, Rubkona and Panrieng revealed same critical nutrition situation. The average GAM at national level projected before the outbreak of war is 22% and a SAM of 4% (IMSAM-Guidlines for Management of Malnutrition, South Sudan). This show that Abiemnom results are of typical South Sudan situation.

7.2 Mortality
The results of mortality (CMR: 0.22(0.08-0.59 and USMR: 0.31(0.07-1.28), remain below the alert level of 1/10,000 people/day and emergency level of 2/10,000 people/day for crude mortality and alert level of 2/10,000 people/day and emergency level of 4/10,000 people/day for under five mortality. Compared to May 2016 survey results (CMR: **0.42 (0.22-0.8395% CI) and U5MR: 0.65 (0.14-3.06 95% CI)**, there are no significant changes over the last 12 months.

7.3 Health
Immunization results showed 79.1% status with vitamin A scoring 75.6%. Both results fall below the recommendation of SPHERE Project 2011 which recommend that if measles vaccination rates and vitamin A supplementation are less than 90 per cent or unknown, there should be a mass measles vaccination campaign conducted for children aged 6 months to 15 years, including the administration of vitamin A to children aged 6–59 months. There was high prevalence of morbidity in the population led by signs and symptoms such as diarrhoea (31.5%), fever (25.2%) and cough (24.9%) and this may partly be due to poor hygiene and sanitation as the community practice poor human waste disposal due to lack of latrines as evidenced by rampant presence of human waste near houses as observed during data collection. The problem could also be due to factors such as poor health seeking practices by mothers as they might not be taking children for medical help immediately the child fall sick. Deworming and mosquito net use have continue to record low rates for the last three years. Finally, there is poor utilization of mosquito net. This might be the reason why there were cases of fever identical to malaria.

7.4 Infant and Young Child Feeding (IYCF)
According to the survey results, there was good observation on some IYCF practices such as continued breast feeding and early initiation of breast feeding, however, exclusive breast feeding and timely introduction to complementary feeding were not equally well observed. On the other hand, minimum meal frequency and minimum dietary diversity for non-breast fed children recorded very low results while minimum acceptable diet was not met by any non-breast fed child in the sample. This could tell the lack of attention on the side of mothers towards the feeding needs of non-breast children or partly due to lack of food items. For breast fed children, minimum meal frequency and minimum dietary diversity recorded ≥40%.

7.5 Water and sanitation situation

Inadequate access to safe water and proper sanitation is a public health issue in the community. Most households in the county consume water from improved source (borehole) however, safety is not guaranteed as it can be contaminated at the source, storage and or transport. In addition, improper household and human waste disposal, poor drainage practices and inadequate sanitary facilities were observed in the community as evidenced by rampant human waste near houses. This is due to lack of proper use of latrines or complete lack of it. This poses a negative health risk of water borne diseases to the community as seen with episodes of diarrhoea cases recorded during data collection. Furthermore, hand washing is only done by most respondents if one wants to cook.

7.6 Food Security and Livelihoods

Two leading main income activities in Abiemnom community include salaried work and sale of crops. Rate of cultivation have increased from 61% in 2015 to 73% in 2016. Sources of food, 7 days prior to survey last year for most households were buying from the market or shop and own production, but this May 2017 survey results revealed that own production is the main source of food for most households 7 days prior to the survey. The food consumption score recorded fall in acceptable category or phase 1 & 2 of IPC. This show improving situation from the last season results which showed critical.

8. CONCLUSIONS

The resultant GAM rate for this survey is way above the WHO emergency threshold of 15%; it is critical or very high based on WHO malnutrition categorization levels. Close monitoring is needed as the malnutrition rates will likely increase considerably due to some other underlying causes in the coming hunger gap period.

There is high morbidity (mainly diarrhoea, fever & cough). Poor IYCF practices, poor health seeking behaviours are some of the underlying factors that can increase current rates. In addition to those possibilities, food insecurity can increase before the next harvest as the little stock will continue to be use. This is evidenced by the fact that most households' source of income are salaried work and sale of crops. Poor minimum meal frequency, minimum dietary diversity and minimum acceptable diet practices are indicators that children are not getting enough nutrients as is required by their needs for growth and development. Most mothers wash hands before they cook food, this show the lack of knowledge on the importance of hand washing after visiting toilet, which can lead to disease spread.

9. RECOMMENDATION

The following recommendations are based on the survey results, and are importance for Care South Sudan, as this survey was done to ascertain nutritional status of the children in Abiemnom County in addition to other underlying causes of malnutrition.

Short-term or Immediate

1. The GAM rate 20.1 % [17.2 - 23.4] found is almost double the WHO emergency level (15%). This has come too early in the year and is an indication that malnutrition rates will increase in the coming hunger gap period. Efforts should be put in place to respond to the raising rates of malnutrition in the area. One possible preparation is to pre-position nutrition items and essential durgs to the area when the road is still passable.

2. It was evidenced during data collection that many malnourished children were in the community, this call for improvement active case finding in all Payams of the county to bring most of malnourished children to facilities for treatment, especially moderately malnourished.

3. Exclusive breast and complementary feeding have continue to be poorly observed by mothers/caregivers over the years, this need some serious and continued engagement with the community to find a solution.

4. Establish awareness campaigns and community education programmes on infant and young child feeding practices

5. Deworming is poor in the community as revealed by the survey results, CARE South Sudan and partners should put in place a strong deworming program to reach all the children in the community.

6. Continue immunizations and vitamin A supplementation activities to reach the few children who have not yet receive the services in the community.

7. Aware the community on the importance of soap use during hand washing.

8. There is need to lobby and advocate among organizations involved in WASH to improve the latrine coverage and curtain the practice of using designated open areas for defecation.

9. Household hunger score showed that most households are in the category of moderate hunger in the household, this level could go to severe hunger in the household in the next few months, therefore, to protect the community, FGD should be continue to enable the population to reach the next harvest of this season.

Long-term

10. Apart from the program to aware the community about the importance of continued attendance at the nutrition centre, for long term improvement, tailored messages should be developed and use to aware mothers of the children visiting the nutrition centres. This can help them on child feeding using the little resources available at home. They can be able to diversify the diet of their children.

11. There is no food security and livelihood program established in the area, there is need to have it so that the population can be provided with seeds and good agricultural methods to help boost food production.

12. In order to enhance food security and there by improve food consumption at household

level, there is a need for implementation of comprehensive food security and livelihoods programs. Promotion of small gardens for production of vegetables and fruits at household level could be considered to improve household food security and consumption of diversified foods.

ANNEXES

Annex 1: Selected Clusters

	Abiemnom 2017 Cluster assignment						
	Geographical unit	Population size	Cluster				
1	Kiirthok	796	1	41	Agongbeek/Gungyakdeng	873	RC
2	Kanyuop	615	2	42	Langtar	739	26
3	Dhuor-Aguer	705	3	43	Buryiom	429	
4	Makuach-Lang	539		44	Nyini-Juooch	821	27
5	Rumathony/Block 3	569	4	45	Yony-yony 1	795	28
6	ChueiAgok/Block 4	537	5	46	Manayol 1	675	29
7	Rumathony/Block 5	621		47	Yony-yony 2	795	30
8	Rumathony/Block 6	579	6	48	Manayol 2	675	31
9	Panashuoth	353	7	49	Gorachiech	252	
10	Kol -Malual	314		50	Pantheet	314	32
11	Panshuei/Ielpiou	400		51	Awarpiny	631	33
12	Kol-Amunweng	273	8	52	Panyang	387	
13	Kol-Malek	460		53	Pathieu	771	RC
14	Hai SuokShurtha	521	9	54	Makuech	681	RC
15	Hai ShukThauna	484	10	55	Loorpiny	755	
16	Hai Shuk PHCC	491		56	Panyang	365	34
17	Ablemnom Centre	822	11	57	Makuechthelach	560	
18	Hai Shuk	692	12				
19	Hai ShukNetwork	442	13				
20	Block 9	539					
21	Bock 10	433	14				
22	Block 12	432					
23	Block 13	544	15				
24	Wurem/Block 7	575	RC				
25	Wurem/Block 8	410					
26	Manakokjok	398	16				
27	Amiethcok	598					
28	Pankuel South	574	17				
29	Pankuel North	623	18				
30	Bangbang	429					
31	Mawut	362	19				
32	Nyor	380					
33	Wunthubai	546	20				
34	Biemkat 1	354	21				
35	Biem Kat 2	412					
36	Biem Kat 3	521	22				
37	Biem Kat 4	519					

38	Biem Kat 5	981	23,24				
39	Agongbeek/Shujun	572					
40	Agongbeek/School	532	25				

Annex 4:

Standardization test: Report for Evaluation of Enumerators

Weight:

	Precision: Sum of Square [W1-W2]	Accuracy: Sum of Square [Enum.(W1+W2)- (Superv.(W1+W2)]	No. +/- Precision	No. +/- Accuracy
Supervisor	0.16		5/0	
Enumerator 1	0.14 OK	0.10 OK	7/1	1/6
Enumerator 2	0.13 OK	0.09 OK	6/1	0/6
Enumerator 3	0.08 OK	0.08 OK	6/2	0/6
Enumerator 4	9.74 POOR	9.78 POOR	5/3	0/7
Enumerator 5	0.07 OK	0.09 OK	6/1	0/6
Enumerator 6	0.07 OK	0.15 OK	6/1	0/6
Enumerator 7	0.11 OK	0.15 OK	6/2	0/6
Enumerator 8	0.11 OK	0.17 OK	6/2	0/6
Enumerator 9	0.31 OK	0.53 POOR	4/3	1/6

Height:

	Precision: Sum of Square [H1-H2]	Accuracy: Sum of Square [Enum.(H1+H2)- Superv.(H1+H2)]	No. +/- Precision	No. +/- Accuracy
Supervisor	0.92		3/6	
Enumerator 1	2.93 POOR	4.43 POOR	2/8	0/9
Enumerator 2	118.51 POOR	73.81 POOR	3/6	3/7
Enumerator 3	47.14 POOR	78.18 POOR	2/6	3/6
Enumerator 4	2.28 POOR	2.66 OK	5/5	2/8
Enumerator 5	6.00 POOR	6.90 POOR	3/5	0/9
Enumerator 6	7.73 POOR	16.77 POOR	3/6	1/9
Enumerator 7	636.09 POOR	680.55 POOR	4/5	5/5
Enumerator 8	101.57 POOR	102.45 POOR	6/3	1/8
Enumerator 9	7.53 POOR	10.81 POOR	4/6	1/8

MUAC:

	Precision: Sum of Square [MUAC1-MUAC2]	Accuracy: Sum of Square [Enum.(MUAC1+MUAC2)- Superv.(MUAC1+MUAC2]	No. +/- Precision	No. +/- Accuracy
Supervisor	220.00		1/8	
Enumerator 1	221.00 OK	711.00 POOR	0/9	1/6
Enumerator 2	209.00 OK	819.00 POOR	1/8	1/8
Enumerator 3	427.00 OK	1303.00 POOR	2/8	3/6
Enumerator 4	839.00 POOR	1009.00 POOR	8/2	6/3
Enumerator 5	156.00 OK	684.00 POOR	5/5	2/7
Enumerator 6	283.00 OK	833.00 POOR	3/7	1/8
Enumerator 7	448.00 POOR	1040.00 POOR	5/5	4/4
Enumerator 8	252.00 OK	650.00 OK	5/5	4/5
Enumerator 9	365.00 OK	595.00 OK	4/5	4/5

Annex 4: Plausibility Report
Plausibility check for: SSD_20170411_CARESSD_ABIEMNOM.as

Standard/Reference used for z-score calculation: WHO standards 2006
(If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

Overall data quality							
Criteria	**Flags***	**Unit**	**Excel.**	**Good**	**Accept**	**Problematic**	**Score**
Flagged data	**Incl**	**%**	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	
(% of out of range subjects)			0	5	10	20	0 (1.9 %)
Overall Sex ratio	**Incl**	**p**	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	2 (p=0.073)
Age ratio(6-29 vs 30-59)	**Incl**	**p**	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	0 (p=0.137)
Dig pref score - weight	**Incl**	**#**	0-7	8-12	13-20	> 20	
			0	2	4	10	0 (6)
Dig pref score - height	**Incl**	**#**	0-7	8-12	13-20	> 20	
			0	2	4	10	2 (11)
Dig pref score - MUAC	**Incl**	**#**	0-7	8-12	13-20	> 20	
			0	2	4	10	2 (10)
Standard Dev WHZ	**Excl**	**SD**	<1.1	<1.15	<1.20	>=1.20	
.			and	and	and	or	
.	**Excl**	**SD**	>0.9	>0.85	>0.80	<=0.80	
			0	5	10	20	0 (1.06)
Skewness WHZ	**Excl**	**#**	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	0 (0.02)
Kurtosis WHZ	**Excl**	**#**	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	0 (0.07)
Poisson dist WHZ-2	**Excl**	**p**	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	0 (p=0.567)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	6 %
The overall score of this survey is 6 %, this is excellent.							

Annex 5: Questionnaire
Anthropometry

		ANTHROPOMETRIC & HEALTH QUESTIONNAIRE											
		(To be conducted in EVERY SELECTED HH with children 6-59 months)											
3	4	6	7	8	9	10	11	12	13	14	15	16	
Child no	Sex **m = f**	Age in months	Weght in Kg (eg 12.4)	Heigh t in cm (eg 78.1)	Oed ema **n = No y =Ye s**	MUA C in cm (eg 11.3)	Vit. A in last 6 months -- ------- **0 = No 1 =Yes**	Measles Vaccine ---- **0** = No **1** =Yes with EPI card **2** =Yes recall **3** = Child <9m	Illness in past 14 days? **0** = No **1** =Yes If no, go to 16	Type of Illness **1** = Fever **2** = Cough **3** = Diarrhoe a 99= Other (specify)	Treatment Sought: **0** = None **1** =Hospital **2** =PHCC/U **3** = Mobile /outreach clinic **4**=CBD **5**=Private clinic **6**=Traditional practitioner **7**=Pharmacy/c hemist **99**=Other (Specify)	Did the child sleep under a mosquit o net(LLI TN) last night? --------- 0= No 1= Yes	Deworm ed in last 6 months (12-59 months) ------- **0** = No **1** =Yes 88 =DK

Infant and young child feeding Part A

11	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8 Yesterday, during the day or at night, did [NAME] receive any of the following liquids?				
Child No.	HH No.	Child Name	Sex M= Male F= Female	Age in months (0-23 months)	Has [NAME] ever been breastfed? (EverBF) 1= Yes 0 = No 8 = Don't know	How long after birth did you first put [NAME] to the breast? 1 = Less than one hour 2 = Between 1 and 23 hours 3 =More than 24 hours 8 = Don't know	Is (Name) still breastfeeding now? 1= Yes 0 = No 8 = Don't know	Plain water 1= Yes 0 = No 8 = Don't know	Infant formula ____ times	Milk such as tinned, powdered, or fresh animal milk ____ times	Sour milk or Yoghurt ____ times	Juice or juice drinks 1= Yes 0 = No 8 = Don't know

Infant and young child feeding questionnaire Part B

11.8 Yesterday, during the day or at night, did [NAME] receive any of the following liquids?			11.9 Describe what did (NAME) eat yesterday during the day or night, whether at home or outside the home since (NAME) woke up yesterday until NAME went to sleep?							11.10 How many times did [child's name] eat solid or semi-solid food other than liquids yesterday during the day or at night?	11.11 Yesterday during the day/night, did [child's name] consume any food given by a health centre for the treatment of malnutrition (Plumpy'Nut, Plumpy' sup, Plumpy'Nut dose, sprinkles/sachet etc) OR fortified food (porridge consisting of several meal mixed, CSB) OR any food with added a micronutrient powder(MNP)?	11.12
clear Broth 1= Yes 0 = No 8 = Don't know	Thin Porridge 1= Yes 0 = No 8 = Don't know	Other water base liquids 1= Yes 0 = No 8 = Don't know	Cereals, flours, grains, roots and tubers 1= Yes 0 = No 8 = Don't know	legumes and nuts (Beans, Peas, Lentils, Nuts and Seeds) 1= Yes 0 = No 8 = Don't know	dairy products (milk, yogurt, cheese) 1= Yes 0 = No 8 = Don't know	flesh foods (meat, fish, poultry and liver/organ meats) 1= Yes 0 = No 8 = Don't know	eggs 1= Yes 0 = No 8 = Don't know	vitamin-A rich fruits and vegetables (carrot, red pepper, pumpkin, Ripe Mangoes, papaya 1= Yes 0 = No 8 = Don't know	other fruits and vegetables (Avocado, Banana, Appile, Grapes, Guava, Lemon, Pinappeale, Cabbage, onions, tomatoes, etc 1= Yes 0 = No 8 = Don't know	(number of times)	1= Yes 0 = No 8 = Don't know	Pregnant and Lactating Women (PLW) MUAC _____cm

DEMOGRAPHY & MORTALITY QUESTIONNAIRE

DATE OF INTERVIEW: [D][D]/[M][M]/ [Y][Y]

COUNTY:	PAYAM:		NAME OF INTERVIEWER:	
BOMA:	VILLAGE:			
CLUSTER NO. [ ][ ]	TEAM NO. [ ][ ]	HOUSEHOLD[1] NO. [ ][ ]		

1	2	3	4	5	6	7	8	9	10
No.	Name	Sex (M/F)	Age (years)	Joined on or after: _____ (Start date of the recall period - February. 12, 2017)	Left on or after:	Born on or after:	Died on or after:	Cause of death 1= illness 2=injury	Location of death 1=current location 2=during migration 3=in place of last residence 99=other, specify
a) List all the people that slept in this household last night.									
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
b) List all the people that slept in this household on the **first night of the recall period (NUER RAIDED CATTLE ON FEB 12TH 2017)** but did **NOT sleep** in the **household last night**.									
1					Y				
2					Y				
3					Y				
c) List all the people that slept in this household on the **first night of the recall period but have since died**									
1							Y		
2							Y		

Was anyone in the household pregnant at the start of the recall period? No [ ] Yes [ ] If yes, how many? _____

[1] HH definition: Group of people living under same roof & sharing food from the same pot . In home with multiple wives, those living and eating in different houses are considered as separate HHs. Wives living in different houses and eating from same pot are considered as one HH.

Food security and livelihood

FOOD SECURITY AND LIVELIHOOD QUESTIONNAIRE
(continue questionning HH's where we've collected Anthro' & Health information)

Date (D/M/Y): ……./……./….....   Cluster No:………   Team N<u>o</u>…..…   State:………………..   County……..……..   Payam:………………

Boma………..……..   Village:………...………

3.12	3.13	3.14	3.15	3.16	3.16	3.17	3.18	3.19	3.20	3.21	3.21a)	3.22	3.22a)	4
H H N O *	HH **size** (No. of people living in HH)	**Resident** status of HH: ---------- **1** = Resident **2** = Returnee (in the last 1yr) **3** = IDP **4** = Refugees	Is the HH **head** male or female? ---------- **1** = Male **2** = Female	What was your HHs main source of **income** in the last 30 days? ----------- **0 =** No income **1** = Sale of crops **2** = Sale of livestock **3** = Sale of animal product **4=** Sale of alcoholic beverages **5** = Sale of fish **6** = Sale of natural resources (firewood; charcoal; grass) **7** = Sale of food aid **8** = Casual	Did you **cultivate** in the recent last season? --------- **0** = No **1** = Yes	Does the HH **own** any livestock, heards or farm animals ? ------ **0** = No **1** = Yes	From the first fighting of December 2013, how has your livestock ownership changed? **1** = Large decrease **2** = Small decrease **3** =	In the past [4 weeks/30 days], was there ever no food to eat of any kind in your house because of lack of resou	How often did this happen in the past [4 weeks/30 days]? ------------ **1** = Rarely (1–2 times) **2** = Sometimes (3–10 times) **3** = Often	In the past [4 weeks/30 days], did you or any household member go to sleep at night hungry because there was not enough food?----------- **0** = No (Skip to Q3.22) **1** = Yes	How often did this happen in the past [4 weeks/ 30 days]? ---------------- **1** = Rarely (1–2 times) **2** = Sometimes (3–10 times) **3** = Often (more than	In the past [4 weeks/30 days], did you or any household member go a whole day and night without eating anything at all because there was not enough food?------ **0** = No (Skip to Q.4.0) **1** = Yes	How often did this happen in the past [4 weeks/30 days]?.... **1** = Rarely (1–2 times) **2** = Sometimes (3–10 times) **3** = Often (more than 10 times	What was the main **source** of **food** in the past 7 days --------- **1** =Own production **2** =Work for food **3** =Gifts from neighbours **4** =Market/shop purchase **5** =Borrowing/debts **6** =Food aid **7**= Hunting **8** = Fishing **9** = Gathering **99**= Other, specify

				Labour **9** = Skilled labour **10** = Salaried work **11** = Petty trading **12** = Family support **13**= Remitance **99**=others (Specify)				Stayed the same **4** = Small increase **5** = Large increase	rces to get food? ---------- **0 =** No (Skip to Q.3.21) **1 =** Yes	(more than 10 times		10 times		

Household Food Consumption & Dietary 4 **Diversity**

cluster…   Date…………

Team………..   ……..   …   Village

	Did members of your household consume any food from these food groups in the last 7 days?(food must have been cooked/served at the household) If yes, mark the **number of days** the food was **consumed in the last 7 days**?

HH NO	Cereals and cereal products	White Roots and Tubers	Legumes, nuts and seeds	Dark green leafy vegetables	orange fleshed tubers and vegetables/Vi	Other vegetables	Vitamin A rich Fruits	Other Fruits	Meat & Offal	Fish and sea foods	Eggs	Milk and milk products	Sugar and honey	Oils/ fats	Miscellaneous
	(e.g. maize, spaghetti, rice, caanjera, bread, biscuits, Kisra, walwal)?	(e.g. white potatoes, yams, cassava and their products)?	(e.g. beans, lentils, green grams, cowpeas; peanut)?	(including Vitamin A-rich sweet pepper, local and wild leafy vegetables)?	(e.g. squash/juices pumpkins, carrots, sweet potatoes that are orange or yellow inside)?	(other local and wild vegetables that are not dark green or leafy e.g cabbage, lettuce, greeen pepper)	(e.g. ripe mangoes, pawpaw, etc which are yellow or orange fleshed)?	(other local and wild fruits that are not yellow or orange fleshed e.g bananas)?	(e.g. beef, sheep/goat/camel or game meat, poultry& products)?			e.g. goat/camel/ fermented milk, milk powder)	sweetened soda or sugary foods such as chocolates, sweets or candies	e.g. cooking fat or oil, butter, ghee, margarine)?	Condiments, spices and beverages e.g. tea, coffee, salt)?

WATER AND SANITATION QUESTIONNAIRE

Date (D/M/Y): …./……./.......   Cluster No:………   Team No…..…   State:………………   County……..……..   Payam:…………….
Boma……….…..   Village:………..……

HH NO	31	32	33	34	35	36	37
	What is the household's main source of drinking water ? ---------- 1=Borehole/hand pump 2=Protected Shallow well 3= Open shallow well 4= Protected spring 5= River /Stream 6= HH connection / Stand pipe /Tanker 7= Dam / Pond 99= Other (specify_____)	How long does it take the HH to collect water (including travel to and from and waiting)? -------------- 1 = ≤30 min 2 = >30min to ≤1hr 3 = >1hr to ≤ 2hr 4 = >2hr to ≤ 4hr 5 = >4hr	How many jerricans of water did the HH use yesterday in total (excluding water for washing clothes and for animal)? (Define how many litres in a jerrycan if the population all use the same)	What do you usually do to water to make it safer before household members drink it? --------- 0 =Nothing 1 =Boiling 2 =Filtering with a cloth 3 =Letting it settle 4 =Water treatment chemicals 99 =Others(Specify)	When do you usually wash your hands (more than one if appropriate - do not prompt) ----- ---- 0 = Never 1 = After defecating 2 = Before cooking 3 = Before eating 4 = Before feeding the baby 5=Affter cleaning the baby 99=other (specify)	What do you use to wash hands? .... 0 = Nothing 1 = Water only 2 = Water + Soap 3 = Water + Ash 99 = other (specify)	Where does the household usually defecate or relieve themselves (include more than one if necessary)? --------- 1 = Undesignated open area 2 = Designated open area 3 = Hole 4 = Latrine 99 = Other (specify)

Months	Seasons	2012	2013	2014	2015	2016	2017
January	Cattle take to Toc Cold season continue		52 CPA	40	28	16	4
February	Winnowing sorghum for storage		51 Chief election	39	27	15 Governor to Abiemnom	3 Ajak Nor killed
March	Clearing of gardens Hot temperatures Cattle take to Toc		50	38	26	14	2
April	Land clearing preparation for planting.		49 Jagei/Bul fighting	37 Rebels killed people in Bentiu	25	13	1
May	Rains begin		48 SPLA day	36 Rebels ran back to Heglig	24	12	
June	Begin planting maize and sorghum.	59	47	35	23	11	
July	Weeding crops and cows put into lwaks.	58 Martyrs day	46 Nuer attack, Ayalak killed	34	22	10	
August	Lack of food in community (hunger gap peak)	57 Matip died	45 Deng Ayiei handover to Chan	33	21 Kiir signed peace in Juba	9	
September	Eating green sorghum And maize.	56	44	32	20	8	
October	Harvesting ends	55 Comboni day	43	31	19 Kiir decreed 28 states	7	
November	Cows removed from lwaks. Cold season begins	54	42	30	18	6	

December	Christmas season continue, tukuls building Cold	Christmas 53	41 Juba fighting	29	17	5		**Abiemnom Calenda**

r of events May_2017